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NEW SPECIES AND RECORDS OF *AONIDELLA*, *LAONICE*, AND *SPIOPHANES* (POLYCHAETA: SPIONIDAE) FROM SHELF AND SLOPE DEPTHS OF THE WESTERN NORTH ATLANTIC

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ABSTRACT

The spionid genera *Aonidella, Laonice,* and *Spiophanes* are reviewed, with emphasis on material examined from deep water in the western north Atlantic. The type specimens of *A. dayi* are reported and described for the first time, and the authorship of this genus is discussed. Two new deep-water species, belonging to the genera *Laonice* and *Spiophanes,* are described. A total of 19 species of *Laonice* and 12 species of *Spiophanes* are recognized and the taxonomic characteristics of these species are presented.

The epibenthic sled collections of benthic infauna from the Western North Atlantic made in the early 1960s by Dr. Howard Sanders of the Woods Hole Oceanographic Institution included many species of spionid polychaetes (Hartman, 1965; Hartman and Fauchald, 1971). These collections from shelf, slope, and abyssal depths provided a major insight into the great diversity of small animals that comprise the deep-sea fauna. In the early 1980s, the U.S. Minerals Management Service (MMS) conducted a monitoring program on Georges Bank at depths of 35–175 m off the coast of Massachusetts followed by a series of studies in deeper water on the Atlantic Continental Slope and Rise (ACSAR). Following Dr. Sanders's example, fine-meshed (0.3 mm) screens were used to process the benthic samples, resulting in the retention of many small animals. These collections, supplemented by additional material collected from shallower depths by individual researchers, formed the basis for a series of papers on various spionid genera (Maciolek, 1981, 1984a,b, 1985, 1987, 1990).

The present paper concludes the studies based on the spionid polychaetes collected by Dr. Sanders. Species of *Laonice* Malmgren and *Spiophanes* Grube are reviewed, with one new species described in each of those genera. Additionally, the genus *Aonidella,* which was first described in my doctoral dissertation (Maciolek, 1983) but prematurely published by López-Jamar (1989) is discussed, as are the accompanying species *A. cirrobranchiata* and *A. dayi*.

SYSTEMATIC ACCOUNT

Aonidella Maciolek in López-Jamar, 1989

Type-species*: Prionospio cirrobranchiata* Day, 1961

Diagnosis.—Prostomium broad, flattened anteriorly, lacking posterior caruncle; occipital tentacle absent; eyes present or absent. Peristomium partly fused to setiger 1; setiger 1 reduced. Branchiae from setiger 2, limited to anterior setigers, 10–16 pairs; all simple, apinnate, elongate, separate from notopodial lamellae. Postsetal lamellae triangular, similar along body. Setae of 2 types: limbate capillaries anteriorly; bi-, tri- or quadridentate hooded hooks with small secondary hood in posterior noto- and neuropodia. Ventral sabre setae absent. Pygidium with 4–6 subequal anal cirri.

Remarks.—Day (1961) described a new species, *Prionospio cirrobranchiata*, from South Africa, and later reported the same species from the continental shelf off North Carolina (Day, 1973). This species differs from the typical *Prionospio* in several characters considered to be of generic importance: (1) the parapodial lamellae do not change in size or shape along the entire length of the body, and are triangular in both rami, rather than broadly oval or foliaceous as is characteristic of *Prionospio* species; (2) the prostomium is flattened rather than conical and does not continue posteriorly as a caruncle; (3) the angle between the small teeth and main tooth of the hooded hooks is much wider than in the hooks of *Prionospio* species; (4) ventral sabre setae are lacking; and (5) the pygidium has four or more similar cirri, rather than the one long dorsomedial and two shorter ventrolateral cirri typical of *Prionospio*. *Aonidella* is similar to *Aonides* Claparède in the form of the hooded hooks, branchiae, and pygidium. In *Aonides* the prostomium is conical, narrow, and tapered anteriorly and posteriorly, whereas in *Aonidella* the prostomium is very broad, flattened anteriorly, almost spadelike, and lacks a posterior caruncle.

This genus was first described in my unpublished dissertation (Maciolek, 1983), and therefore was not formally available. The name *Aonidella* and that of my new species, *A. dayi*, were both used by López-Jamar (1989), who reported the species from the Gulf of Cadiz, citing it as "*A. dayi* Maciolek, 1983", acknowledging my dissertation as the basis for the validity of both the genus and the species. He published an illustrated description of *A. dayi* based on and extending my original description, thus making the genus and species names available, with the authorship Maciolek in López-Jamar, 1989 (ICZN 1985, Article 50a). *A. dayi* has also been reported from Japan by Imajima (1992), and the generic name has been used by Sigvaldadóttir, Mackie, and Pleijel (1997) in connection with a cladistic analysis of spionid genera.

Etymology.—*Aonidella*, diminutive of *Aonides*, Greek, the Boetian women, the Muses.

Aonidella cirrobranchiata (Day, 1961)
(Fig. 1)

Prionospio cirrobranchiata Day, 1961:488; 1967:488.

Material Examined.—Southwest Africa: coll. J. H. Day, sta. WCD79M, 8 Oct. 1960, 34°17′S, 17°53′E, 320 m, 2 paratypes (BMNH ZK1961.9.480/1); sta. SCD228R, 5 Dec. 1960, 35°43.5′S, 20°31′E, 144 m, 13 spec.; sta. SCD232P and SCD233R, 4 Dec. 1960, 36°28.5′S, 21°11′E, 182 m, 11 spec. (BMNH ZK1961.19.572/595).—Bay of Biscay, coll. H. L. Sanders, 24 Jul. 1967, *Sarsia* sta. 63, 46°17.5′N, 04°45.2′W, 1336 m, epibenthic sled, 1 spec. (USNM 80482).

Description.—Small species, up to 15 mm long, 0.3 mm wide for 60 setigers. Color in alcohol white to medium brown. Prostomium broadly rounded anteriorly, somewhat square, depressed, flattened (Fig. 1A); posterior caruncle absent; bifid nuchal organ extending to base of setiger 1 (Fig. 1A); eyes absent. Peristomium fused with setiger 1, lacking lateral wings (Fig. 1A,B).

Branchiae from setiger 2, 10–12 pairs; simple, smooth, elongate; each branchia attached to base of notopodia, about twice as long as notopodial lamellae (Fig. 1A,B). Notopodial lamellae placed laterally, smallest on setiger 1; lamellae triangular, similar

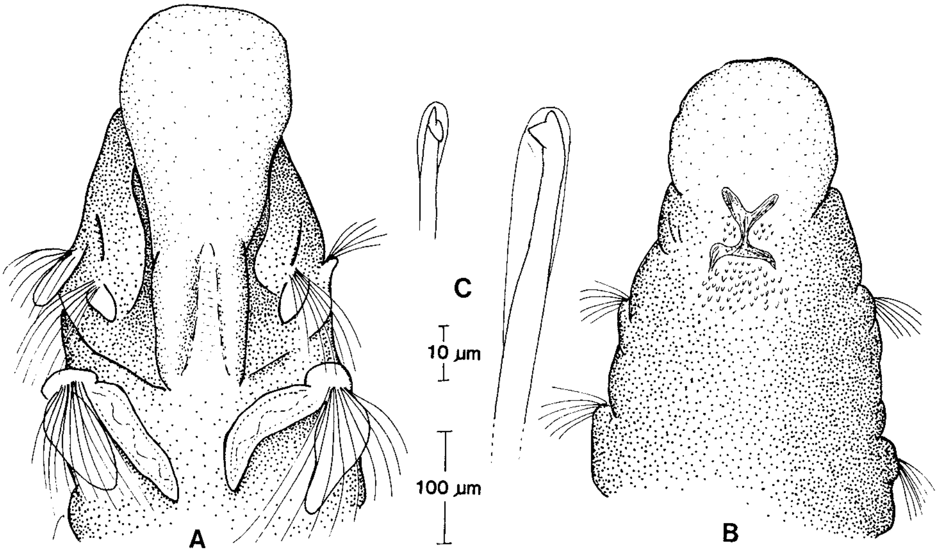

Figure 1. *Aonidella cirrobranchiata* (Day, 1973) (BMNH ZK1961.19.572/595). A. Anterior end in dorsal view, palps removed. B. Anterior end in ventral view. C. Neuropodial hooded hooks.

along entire length of body, not connected as dorsal ridges or crests. Neuropodial lamellae triangular, similar to but smaller than notopodial lamellae, subequal along length of body.

Anterior setae broad limbate capillaries, striated, lightly granulated; capillaries arranged in two rows, with setae of anterior row shorter than setae of posterior row. Neuropodial hooded hooks from setiger 18–19, up to 4–5 per fascicle; notopodial hooks from setiger 30–35, up to 4–5 per fascicle; hooks bidentate (Fig. 1C), with very small secondary hood. Pygidium with four similar cirri.

Remarks.—Day (1961) described this species from his South African collections. The holotype could not be found in either the British Museum of Natural History (Muir, pers. comm.) or the University of Cape Town (Day, pers. comm.). Paratypes and non-type specimens were examined and illustrated. See Remarks (below) for *A. dayi*.

Records.—Southwest Africa, Bay of Biscay, 144–1336 m.

Aonidella dayi Maciolek in López-Jamar, 1989
(Fig. 2)

Prionospio cirrobranchiata: Day, 1973: 73. Not *P. cirrobranchiata* Day, 1961.
Aonidella dayi: López-Jamar, 1989: 107–110.—Imajima, 1992: 57–60.

Material Examined.—Massachusetts: Georges Bank, Benthic Infaunal Monitoring Program, sta. 8, 40°27.1′N, 67°37.4′W, 152 m, Feb. 1983, 1 spec., May 1983, 2 spec.; sta. 16, 40°34.2′N, 67°12.3′W, 145 m, Feb. 1982, 1 spec., Jul. 1982, 2 spec., Feb. 1983, 1 spec., Feb. 1984, 1 spec.; sta. 17, 40°35.0′N, 67°11.7′W, 141 m, Jul. 1982, 1 spec., Feb. 1983, 2 spec., May 1983, 1 spec.; sta. 18, 40°33.5′N, 67°13.7′W, 152 m, Feb. 1982, 1 spec., Jul. 1982 1 spec., May 1983, 1 spec.—North Carolina: off Beaufort, coll. J. H. Day, 34°19′N,

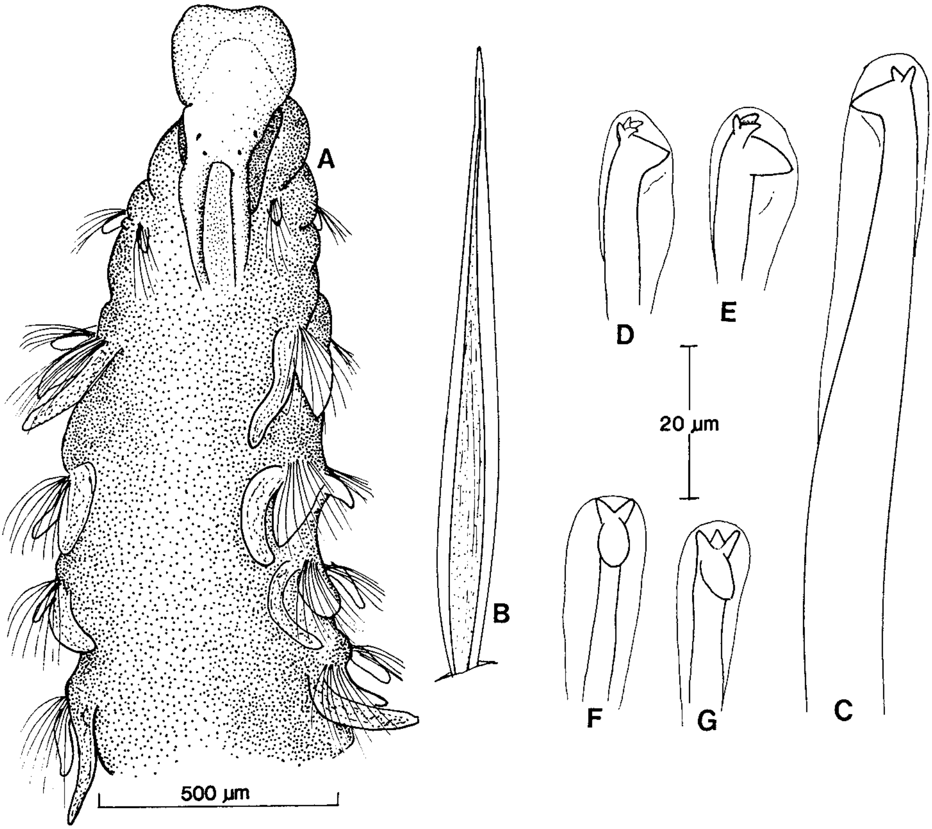

Figure 2. *Aonidella dayi* Maciolek in López-Jamar, 1989 (holotype, USNM 80476). A. Anterior end in dorsolateral view, palps removed. B. Capillary seta from anterior notopodia. C-G. Neuropodial hooded hooks.

75°56′W, 130 m, holotype (USNM 80476), 5 paratypes (USNM 43154, as *P. cirrobranchiata*); coll. J. F. Grassle, 13 Mar. 1965, sta. 738, 34°17.5′N, 75°49.0′W, 445 m, 1 spec. (USNM 80477). —Virginia: coll. Virginia Institute of Marine Science, BLM Mid-Atlantic Benchmark Study, sta. 14/A BLM-06B, 13 Mar. 1977, 37°08.1′N, 74°36.9′W, 94 m, 1 spec. (USNM 56842, as *P. cirrobranchiata*). —Mediterranean Sea, coll. H. L. Sanders, 2 Sep. 1960, ATLANTIS II cruise 59, sta. 211, 33°57.0′N, 50°08.2′E, 500–509 m, epibenthic sled, 2 spec. (USNM 80478).—Canary Islands: coll. H. L. Sanders, 20 Mar. 1968, DISCOVERY sta. 6711, 27°13′N, 15°41′W, 3301 m, epibenthic sled, 2 spec. (USNM 80479).

Description.—Small species, measuring up to 17.5 mm long and 0.5 mm wide for ca 70 setigers (complete). Holotype 0.5 mm wide and 3.5 mm long for 16 setigers (incomplete) (Fig. 2A). Color in alcohol white. Prostomium broad anteriorly, flattened, with slight medial indentation (Fig. 2A); bifid nuchal area extending posteriorly to base of setiger 1; four distinct eyes present near posterior of prostomium (Fig. 2A). Peristomium fused with setiger 1, lateral wings absent.

Branchiae from setiger 2, 10–12 pairs; simple, smooth, elongate, separate from notopodial lamellae. Notopodial lamellae triangular, smallest on setiger 1, similar along body; not forming dorsal ridges or crests. Neuropodial lamellae similar to but smaller than notopodial lamellae, triangular; lamellae smallest on setiger 1, larger, similar along length of body.

Anterior setae capillaries, arranged in two rows, with setae of anterior row shorter than those of posterior row; each seta striated, lightly granulated (Fig. 2B). Neuropodial hooded hooks from setiger 14–20, up to five per fascicle; notopodial hooks from setiger 20, up to four per fascicle, accompanied by thin capillaries in both rami; each hook with 2–4 small teeth above main tooth (Fig. 2C–G), with very small secondary hood. Ventral sabre setae absent. Pygidium with four simple cirri.

Remarks.—*Aonidella dayi* is closely related to *A. cirrobranchiata*, but differs in having a slight medial indentation on the prostomium, four eyes instead of none, and hooded hooks with 2–4 apical teeth instead of one. There is little probability that the 2–4 lateral apical teeth in *A. dayi* could ever be worn down to resemble the single, medial apical tooth of *A. cirrobranchiata*. These hooks do appear quite variable, however, depending on the angle at which they are viewed, and, presumably, the degree to which they may have been worn. All of the forms of hooks illustrated were observed in a single specimen, within one or a few setigers.

As discussed above in the generic remarks, López-Jamar (1989) reported this species from the Gulf of Cadiz. His description and illustrations and those of Imajima (1992) agree very well in all major characters with this original material. Neuropodial hooks are reported to begin within a tight range of setigers 14–20 (this paper), 16–19 (López-Jamar), and 18–20 (Imajima) in spite of size differences among specimens examined. However, both López-Jamar and Imajima reported up to 16 pairs of branchiae, rather than the maximum of 12 pairs reported here. Additional material collected on Georges Bank and available to me after the original description of this species in my dissertation included complete specimens.

Etymology.—This species is named in honor of the late Dr. J. H. Day, Cape Town, South Africa, in recognition of his major contributions to polychaete systematics and as the initial describer of this species complex.

Records.—Georges Bank, North Carolina, Virginia, Canary Islands, Mediterranean Sea; Gulf of Cadiz; Japan; 94–3300 m.

Laonice Malmgren, 1867

Laonice Malmgren, 1867: 200. Type-species: *Nerine cirrata* M. Sars, 1851, designated by Malmgren, 1867.

Spionides Webster and Benedict, 1887: 735. Type-species: *S. cirrata* Webster and Benedict, 1887 (Homonym, = *L. cirrata* (Sars)), by monotypy. fide Hartman, 1959

Aricideopsis Johnson, 1901: 413. Type-species: *A. megalops* Johnson 1901, by monotypy. fide Hartman, 1959

Diagnosis.—Prostomium anteriorly rounded or medially incised, frontal horns present or absent; occipital tentacle usually present; nuchal organ extending posteriorly for variable number of setigers. Peristomium reduced, usually lacking lateral wings. Branchiae from setiger 2, on variable number of setigers, separate from or partly fused with dorsal lamellae; branchiae apinnate or with digitiform pinnules. Notopodia with capillaries, hooded hooks present or absent; neuropodia with capillaries, bi- tri- or multidentate hooded hooks, sabre setae. Interparapodial genital pouches present. Pygidium with anal cirri.

Remarks.—The first occurrence of interparapodial genital pouches has been used by some authors as a specific character within *Laonice* (Söderström, 1920; Hartman, 1953; Banse and Hobson, 1968; Blake and Kudenov, 1978). Other authors considered this character to be unreliable for delimiting species (Fauvel, 1927; Foster, 1971). Foster (1971) synonymized all known species and subspecies with *Laonice cirrata* (Sars) on the basis of the variability within one collection of the first appearance of the interparapodial genital pouches and of the neuropodial hooded hooks.

After Foster's study, however, Blake and Kudenov (1978) described three new species from Australia based on several characters in addition to the distribution of interparapodial genital pouches, including the configuration of the caruncle, capillary setae, hooded hooks, and parapodia. Blake (1983) also reexamined the type specimens of *L. antarcticae* Hartman, 1953, and considered that species, as well as *L. weddellia* Hartman, 1978, as separate from *L. cirrata*.

Sikorski et al. (1988) examined a large (ca 4000 specimens) collection of *Laonice* from the Arctic Ocean and evaluated the variability of several morphological features. They concluded that the collection contained several distinct species, including a new one which they named *L. blakei*. They also pointed out that several characters, including the first appearance of the genital pouches, can be both constant within a species and also related to the size of the specimen. Information on the size of the material examined is therefore necessary to ensure that comparisons are being made between animals of similar age/sizes.

Ward (1981) described a new species from Hawaii, *L. papillibranchiae*, which has digitiform pinnules on the branchiae. Nonato et al. (1986) described a species from Brazil, *L. branchiata*, which has a secondary branchia at the base of each primary gill. Blake (1996) described *L. nuchala*, a species distinguished by triple nuchal grooves, from the Santa Maria Basin off California.

Laonice brevicristata, described by Pillai (1961) from a brackish-water lake in Ceylon, has a short dorsal sense organ and apparently lacks an occipital tentacle. Sikorski (1997) named a new species, *L. dayianum*, for material collected by Dr. J. H. Day off the coast of North Carolina and identified by him as *L. cirrata*. The English abstract for this Russian paper states that "the basic distinguishing feature of the species is the absence of the occipital tentacle"; however, the illustration provided indicates a tentacle or the scar of a tentacle on the prostomium. Both species should be reevaluated. Sikorski and Wu (1998) described *L. sinica* from the Yellow Sea (in Russian).

In the present study, the type material of *L. antarcticae* Hartman 1953, *L. japonicus* (Moore, 1907), *L. sarsi* Söderström, 1920 and *L. bahusiensis* Söderström, 1920 was examined and all four were determined to be distinct species. *Laonice sarsi*, which superficially appears similar to *L. cirrata*, was confirmed as possessing notopodial hooded hooks, as reported by Söderström (1920: 224). Blake (1996) effectively emended the generic diagnosis of *Laonice* when he, for the first time, but without any discussion, included the presence of notopodial hooks as part of the generic definition.

Nineteen species of *Laonice*, including one new species from deep water, are presently recognized (Table 1). Although Johnson's (1901) genus *Aricideopsis* Johnson, 1901 was referred to *Laonice* by Hartman (1959), but her only notation concerning the species *A. megalops* was "questionably *Laonice cirrata.*" (Hartman, 1959). Based on the original

Table 1. Taxonomic characters of *Laonice* species.

Species*	Anterior prostomial shape	Eyes	Caruncle extends to setiger	Lateral pouches start	No. pairs branchiae	Neuropodial hooks		Comments
						Start	No. teeth	
1. *cirrata* (Sars, 1851)	Rounded, entire, anteriorly broad	2	12–30	25/26	35–44	40–50	2–3	Prostomium fused laterally with peristomium
2. *japonica* (Moore, 1907)	Rounded, with slight lateral horns	2	18	4/5	40	41	2	With postbranchial dorsal crests
3. *antarcticae* (Hartman, 1953)	Rounded or slightly incised	0–2	5-12	4/5	30	35–40	3	With low postbranchial dorsal ridges
4. *weddellia* Hartman, 1978	Rounded or slightly incised; narrow	6	12–20	8/9–10/11	?	20–21	3	Anterior capillaries in 5 tiers
5. *bahusiensis* Söderström, 1920	Rounded	?	27–31	12/13–17/18	28–32	27–32	3	
6. *appelloefi* Söderström, 1920	Rounded	0	13	7/8	24	17–20	2	Anterior capillaries in more than 2 rows
7. *sarsi* Söderström, 1920	Rounded	2	8–13	14/15–28/29	26–31	32–37	2	With notopodial hooded hooks
8. *brevicristata* Pillai, 1961	Rounded	2	7–8	20/21–30/31	39–44	40–45	2	Lacks occipital tentacle
9. *pugettensis* Banse & Hobson, 1968	Flattened	2	25	2/3–7/8	24–33	30–33	3	Inconspicuous post-branchial dorsal ridges
10. *quadridentata* Blake & Kudenov, 1978	Bluntly rounded	4, fused	18	6/7?	40	40	4	
11. *bassensis* Blake & Kudenov, 1978	Medially incised	0	7	2/3	?	22–23	2	
12. *hermaphroditica* Blake & Kudenov, 1978	Bluntly rounded	4	50	1/2	?	24–25	4	
13. *papillibranchiae* Ward, 1981	Rounded, medially incised	2	?	12/13	ca. 50	16–19	2	Branchiae with digitiform pinnules
14. *branchiata* Nonato, Bolivar & Lana, 1986	Rounded	4	9–10	4/5	ca. 40	27–37	2	Vascularized auricular lobe at base of branchiae
15. *blakei* Sikorsky & Zhirkov, 1988	Broadly rounded	0	10–11	3/4	? (ca. 25)	21	5–9	Prostomium completely separate from peristomium
16. *nuchala* Blake, 1996	Broadly rounded or weakly incised	4	13 (triple)	7/8 – 8/9	? (ca. 40)	22	4	
17. *magnacristata*, new species	Rounded, narrow	0	2	7/8	6	18	3	Large dorsal crests set. 11–ca. 22

*Details not available for *L. dayianum* Sikorski, 1997 and *L. sinica* Sikorski & Wu, 1998.

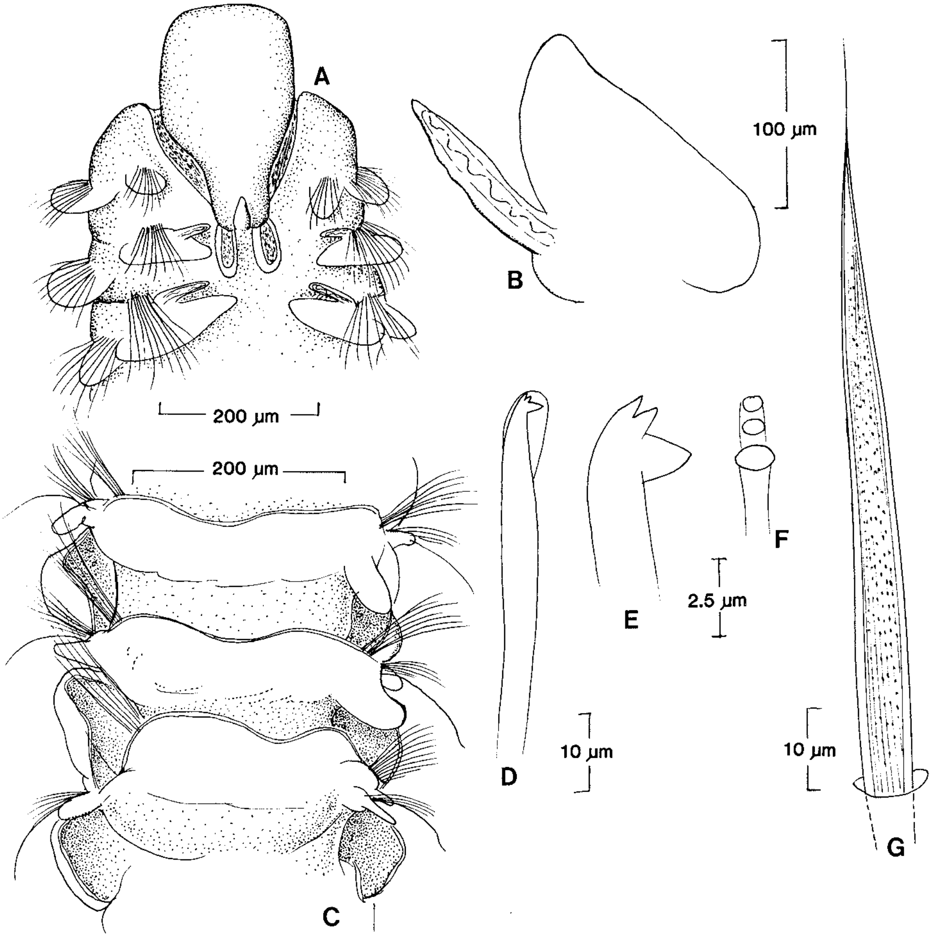

Figure 3. *Laonice magnacristata*, new species (holotype, AHF Poly 1386). A. Anterior end in dorsal view, palps removed. B. Notopodium from setiger 5, setae not shown. C. Setigers 17-19 in dorsal view. D-F. Neuropodial hooded hooks (hoods not shown E-F). G. Anterior notopodial capillary seta.

description, *L. annenkowae* Zachs, 1925 does not appear to belong to this genus, because it lacks interparapodial genital pouches and has branchiae present from setiger 1 rather than 2. Three species were represented in the collections examined during this study, including *L. cirrata* (Sars, 1851); *L. antarcticae* Hartman, 1953; and *L. magnacristata*, new species.

Laonice magnacristata new species
(Fig. 3)

Prionospio cirrifera: Hartman, 1965: 150 (in part, portions of sta. HH3, G1, GH3, Bel). Not *Prionospio cirrifera* Wirén, 1883.

Material Examined.—Gay Head-Bermuda Transect: coll. H. L. Sanders, ATLANTIS, 13 Apr. 1960, sta. Bermuda 1, 32°16.5′N, 64°42.5′W, 1000 m, 1 spec. (AHF); ATLANTIS cruise 264, 21 May 1961, sta. HH3, 38°47′N, 70°08′W, 2900 m, holotype (AHF Poly 1386), 3 spec. (AHF); sta. G1, 39°42′N, 70°39′W, 2000 m, 1 spec. (AHF); ATLANTIS cruise 273, 3 Oct. 1961, sta. GH2, 39°27.5′N, 70°33′W, 2478 m, 1 spec. (AHF). —Ireland-Woods Hole Transect: coll. H. L. Sanders, CHAIN cruise 106, sta. 323, 21 Aug. 1972, 50°08.3′N, 13°53.7′W, 3338–3356 m, epibenthic sled, 7 spec. (AHF). —ACSAR Stations: material from 22 stations ranging in depth from 1515 to 3008 m: northernmost station 40°57.21′N, 66°13.85′W (2100 m), southernmost station 31°35.23′N, 75°10.62′W (3008 m).

Description.—Very small species, holotype 0.25 mm wide, 0.75 mm long for 22 setigers (incomplete). Additional material 0.25–0.4 mm wide and up to 9 mm long for 40+ setigers. Color in alcohol pale yellowish brown. Prostomium anteriorly rounded, narrow, widest in midregion, tapering posteriorly, ending on setiger 2; double-looped nuchal organ extending slightly beyond posterior end of prostomium; eyes absent; occipital tentacle present (Fig. 3A).

Branchiae on setigers 2–8, small, partly fused to notopodial lamellae (Fig. 3B). Notopodial lamellae small, triangular; neuropodial lamellae smaller than notopodial lamellae, rounded. Large dorsal crests from setiger 11, continuing for variable number of setigers (through setiger 22 on largest incomplete specimen) (Fig. 3C). Interparapodial lateral pouches starting between setigers 7 and 8.

Notopodial setae capillaries, anterior setae broad, narrowly sheathed, lightly granulated, arranged in two rows (Fig. 3G); posterior notopodial capillaries narrower. Neuropodial hooded hooks from setiger 18–19, up to six per fascicle; hooks tridentate, with two small teeth in tandem above main tooth (Fig. 3E,F). Ventral sabre setae from setiger 6, 1–2 per fascicle; each seta narrow, exceptionally long, broadly sheathed, not granulated. Pygidium unknown.

Remarks.—*Laonice magnacristata* differs from other species in this genus by having a reduced number of branchiae (6 vs 25–50 pairs), a very short caruncle reaching only to setiger 2 rather than to setigers 5–30, and extremely long, thin sabre setae rather than stout, curved sabre setae. Also, the dorsal crests are much larger in proportion to the size of the animal than are similar structures in other species. The species is similar to *L. appelloefi* Söderström in having interparapodial genital pouches from setiger 7/8, but differs in having notopodial capillaries arranged in two rows, a short caruncle, six pairs of branchiae and tridentate hooded hooks, rather than capillaries arranged in up to four rows, a caruncle extending to setiger 13, 24 pairs of branchiae, and bidentate hooks. *Laonice japonica* also has dorsal crests, but has 40 pairs of branchiae, a caruncle that reaches to setiger 18, and interparapodial pouches starting between setigers 7 and 8. Other species, including *L. antarcticae* and *L. pugettensis*, have low or inconspicuous dorsal ridges.

L. magnacristata is probably the smallest of the described species of *Laonice*, but it occurs at great depths, where small size is typical of benthic infaunal species. One of the largest specimens (40+ setigers, nearly 9 mm long), collected at 1996 m at an ACSAR station off Cape Fear, was a mature female. At the time of preservation, eggs were being squeezed from nephridial openings in the intersegmental pockets just dorsal to the interparapodial pouches. These eggs, which measure 60–70 µm in diameter, are irregular in shape and have a finely reticulate envelope. A large germinal vesicle is apparent in each egg.

Etymology.—Latin, *magna* for large and *cristata* for crested. The specific name *magnacristata* refers to the large dorsal crests present on this species.

Records.—North Atlantic, off Ireland and the east coast of North America to South Carolina; 1000–3356 m.

Laonice antarcticae Hartman, 1953

Laonice cirrata antarcticae Hartman, 1953: 40–41.
Laonice antarcticae: Hartman, 1965: 147–148; 1978: 61 (in part, fide Blake, 1983).—Banse and Hobson, 1968: 24.—Hartman and Fauchald, 1971:104.—Blake, 1983: 219-221, fig. 8.
?Laonice cirrata: Hartman, 1967: 112 (in part). Not Sars, 1851.
Prionospio cirrifera: Hartman, 1965: 150 (in part, portion of sta. GH1, Sta. DI). Not Wirén, 1883.
Spiophanes wigleyi: Hartman, 1965:153 (in part, portion of sta. Slope 2). Not Pettibone, 1962.

Material Examined.—Gay Head-Bermuda Transect: coll. H. L. Sanders, ATLANTIS cruise 273, 27 Sep. 1961, sta. GH1, 39°25.5′N, 70°35′W, 2500 m, 1 spec. (AHF); ATLANTIS cruise 277, 22 May 1962, sta. D1, 39°54.5′N, 70°35′W, 468–509 m, 8 spec. (AHF); ATLANTIS cruise 283, sta. Slope 2, 28 Aug. 1962, 40°01.8′N, 70°42′W, 200 m, 2 spec. (AHF); CHAIN cruise 30, sta. 87, 6 Jul. 1965, 39°48.7′N, 70°40.8′W, 1102 m, epibenthic sled, 4 spec. (AHF).

Remarks.—*Laonice antarcticae* was described by Hartman (1953) as having branchiae first present from setiger 3; however, the type specimen was examined, and a small pair of branchiae were present on setiger 2. Blake (1983) also examined the type material and provided a detailed redescription of this species. *L. antarcticae* is similar to *L. japonica* (Moore) in having the interparapodial genital pouches first present from between setigers 4 and 5, and in having small frontal horns on the prostomium. It differs from *L. japonica* in having trifid rather than bifid hooded hooks, and in having postbranchial dorsal ridges that are low, rather than developed into dorsal crests.

Records.—North Atlantic Ocean, 200–2864 m off eastern North America; South America: off Surinam and Brazil, 520–1500 m; off Argentina and Uruguay, 70–96 m; Antarctic and subantarctic seas, 27–3697 m.

Laonice cirrata (Sars, 1851)

Nerine cirrata Sars, 1851: 207; 1861: 64.—Wirén,1883: 409.
Scolecolepis cirrata: Malmgren, 1867: 199.—Verrill, 1873: 4–11.—Smith and Harger, 1874: 16,21.—Verrill and Smith, 1874: 308.—Webster and Benedict, 1884: 726; 1887: 735.—Whiteaves, 1901: 76.—Söderström, 1920: 227.

Laonice cirrata: Malmgren, 1867: 200.—Southern, 1914: 97.—Söderström, 1920: 220.—Fauvel, 1927: 38.—Hartman, 1965: 148 (in part); 1966: 15–16; 1969: 107–108; Hartman and Fauchald, 1971: 104.—Foster, 1971: 69–72 (in part).—Blake, 1983: 222–224, 1996: 111.—Sikorski et al., 1988: 831–834.—Orrhage and Sundberg, 1990: 173–178.
Spionides cirratus Webster and Benedict, 1887: 736.—Söderström, 1920: 227.
?Laonice cirrata: Hartman, 1967: 112 (in part). fide Blake, 1983.
Laonice cirrata postcirrata Hartmann-Schröder, 1965: 206. fide Foster, 1971.
Laonice cirrata praecirrata Hartmann-Schröder, 1965: 207. fide Foster, 1971.

Material Examined.—Gulf of Maine: coll. MMS, Nov. 1981, sta. 14, 41°34.2′N, 68°59.0′W, 140 m, 3 spec. —Georges Bank: coll. MMS, Jul. 1981, sta. 8, 40°27.1′N, 67°37.4′W, 140 m, 1 spec.; 13 May 1982, sta. 18, 40°33.5′N, 67°13.6′W, 150 m, 2 spec.; GRAMPUS sta. 10218, 40°20′N, 68°06′W, 21 Jul. 1914, 2 spec. (USNM).—Gay Head-Bermuda Transect: coll. H. L. Sanders, ATLANTIS cruise 283, sta. Slope 3, 28 Aug. 1962, 39°58.4′N, 70°40.3′W, 300 m, anchor dredge, 3 spec. (AHF).

Remarks.—*Laonice cirrata* is a widespread species, often considered to be cosmopolitan. As discussed above, Foster (1971) synonymized several species and subspecies with *L. cirrata* on the basis of the variability of the characters within a single collection of individuals, but subsequent authors (Banse and Hobson, 1968; Blake and Kudenov, 1978; Blake, 1983; Sikorski et al., 1988) considered many of these species to be valid and separate from *L. cirrata*. Orrhage and Sundberg (1990) assessed morphological differences in species of *Laonice* from the Arctic and northern Europe; they concluded that *L. sarsi, L. bahusiensis*, and *L. cirrata* are all valid, separate species. Records of *L. cirrata* should be interpreted with caution, therefore, because other species may also occur in the same geographic area. In the present study, *L. cirrata* was found to co-occur with *L. antarcticae* at slope depths off New England. Blake (1996) pointed out the unique fusion of the peristomium with the prostomium in *L. cirrata*, providing an easy diagnostic feature for this species.

Many regenerating specimens were found in the material from Georges Bank. The regenerating portion, usually the anterior end, had a unique appearance, with the segments compressed, much wider than long, the palps very short, and the prostomium round and lacking eyes. The entire regenerating portion was always much smaller in diameter than the rest of the body, but was often quite long, extending for as much as 20 setigers.

Records.—East and west coasts of North America [Sikorski (1997) believes Long Island (New York) to be the southern extent of *L. cirrata* on the east coast of North America; however, published records of the species suggest it ranges farther south in deeper water (Hilbig, 1994)]; eastern Atlantic (Norway, Ireland); eastern Pacific from Canada to California, Chile, Antarctica; 5–1120 m.

Spiophanes Grube, 1860

Spiophanes Grube, 1860. Type-species: *Spiophanes kroyeri* Grube, 1860, by monotypy.
Morants Chamberlin, 1919. Type species: *Morants duplex* Chamberlin, 1919, by monotypy. fide Blake 1996.

Diagnosis.—Prostomium anteriorly broad, rounded or bell shaped, with or without frontal or lateral horns; occipital tentacle present or absent; eyes present or absent. Branchiae entirely absent. Setigers 1–4 shifted dorsally, with well-developed noto- and neuropodial lamellae; middle and posterior noto-and neuropodia laterally placed, reduced; middle setigers with ventral, highly glandular interramal region. Notopodial setae capillaries. Neuropodia of setiger 1 with 1–3 large, curved crook setae in addition to capillaries; neuropodial hooks first present from setiger 15–16; hooks bi-, tri-, or quadridentate, with or without reduced hood. Supernumerary or bacillary setae present or absent in glandular region of setigers 5–16. Ventral sabre setae present in middle and posterior setigers. Pygidium with anal cirri, with or without other processes or papillae.

Remarks.—The genus *Spiophanes* was reviewed by Pettibone (1962) and Foster (l97l),who recognized a total of eight species and one subspecies. Both authors considered that *Spiophanes uschakovi*, 1933; *S. tcherniai* Fauvel, 1951; and *S. soederstroemi* Hartman, 1953 were insufficiently characterized and therefore indeterminable. However, Blake (1983), working with new materials as well as type specimens, established that *S. tcherniai* and *S. soederstroemi* are valid species, and considered *S. chilensis* Hartmann-Schröder 1965 as synonymous with the latter. Solis-Weiss (1983) described a new species, *S. lowai*, from the Pacific coast of Mexico. Imajima (1991) described *S. japonicum* and *S. urceolata* from Japan. Blake (1996) synonymized *S. japonicum* with *S. berkeleyorum* and discussed but did not formally synonymize *S. urceolata* with *S.wigleyi*.

Fauchald and Hancock (1981) transferred *Spiophanes pallidus* Hartman 1960 to a new genus, *Spiophanella*, on the basis of the lack of the enlarged crook setae in setiger 1, which characterizes the genus *Spiophanes*. *S. pallida* also differs from typical *Spiophanes* species in the form of the hooded hooks. In *Spiophanes*, the hooks are short, stubby, and have a reduced hood, while in *Spiophanella* they are long-shafted, multidentate, and have a complete hood (Hartman, 1960). Fauchald and Hancock (1981: 13) indicate that *Spiophanes anoculata* Hartman 1960 is also a *Spiophanella*, but later (1981: 46) list it as a *Spiophanes*. Since according to Hartman (1960: 118) that species does have crook setae in setiger 1, it is properly assigned to *Spiophanes*. *S. anoculata* was redescribed by Blake (1996).

In the present study, one new deep-water species is described, bringing the total *Spiophanes* species to 12 (Table 2). Five species were represented in the collections examined in this study, including *S. kroyeri* Grube,1860; *S. bombyx* (Claparède, 1870); *S. soederstroemi* Hartman, 1953; *S. wigleyi* Pettibone, 1962; and *S. abyssalis*, new species. Details are presented here for *S. abyssalis* and *S. soederstroemi*; the other three species have been previously described. Readers are referred to Maciolek (1983) for records of those species. Critical morphology of all known *Spiophanes* species is provided in Table 2.

Spiophanes abyssalis new species
(Fig. 4)

Material Examined. — Canary Islands: coll. H. L. Sanders, 18 Mar. 1968, DISCOVERY sta. 6709, 27°29.8′N, 15°20′W, 2351 m, epibenthic sled, holotype (USNM 80498).—Bay of Biscay: coll. H. L. Sanders, 25 Jul. 1967, SARSIA sta. 65, 46°15.0′N, 04°50′W, 1922 m, epibenthic sled, 9 spec. (USNM 80499). —Ireland-Woods Hole transect: coll. H. L. Sanders, 21 Aug. 1972, CHAIN cruise 106, sta. 323, 50°08.3′N, 12°53.7′W, 3338–3356 m, epibenthic sled, 3 spec. (USNM 80500).

Table 2. Taxonomic characters of *Spiophane*s species.

Species	Anterior prostomial shape	Occipital tentacle	Crook setae	Hooks hooded	No. teeth	Bacillary setae	Nuchal organ	Lateral pouches	Comments
1. *kroyeri* Grube, 1860	Rounded to bell shaped	Yes	Clear	No	3	Yes, brush-tipped	Well developed to set.13–15	Yes	
2. *bombyx* (Claparède, 1870)	Frontal horns	No	Distally granulate	Yes	2–3 or 5	Yes, smooth	2 parallel bands to set. 3–4	No	
3. *wigleyi* Pettibone, 1962	Rounded	No	Not granulate	Yes	3	Yes, bristled	W-shaped	No	
4. *soederstroemi* Hartman, 1953	Triangular to bell shaped	No	Clear	No	4	Not apparent	Present or absent	No	
5. *berkeleyorum* Pettibone, 1962	Bell shaped	Yes	Distally granulate	No	4	Yes, bristled	2 parallel bands to set. 15–19	No	Includes *S. japonicum* Imajima 1991, fide Blake 1996
6. *tcherniai* Fauvel, 1951	Frontal horns	No	Granulate	Yes	3	?	?	No	
7. *longicirris* Caullery, 1944	rounded	Yes	?	No	3	?	?	?No	
8. *duplex* (Chamberlin, 1919)	Bell shaped or with lateral swellings	No	?	No	3	None	2 parallel bands to set. 15–19	No	Includes *S. missionensis* Hartman,1941 fide Blake 1996
9. *anoculata* Hartman, 1960	Frontal horns	No	Brassy yellow	Yes	2	None described	Double to set. 2	No	
10. *lowai* Solis-Weiss, 1983	Subtriangular	Yes	?	No	4	Yes, frayed	Poorly developed	?No	
11. *urceolata* Imajima, 1991	Triangular to bellshaped	No	Granulate	Yes	4	None described	W-shaped	No	
12. *abyssalis*, new species	Lateral horns	Yes	Clear	Yes	3	Yes, brush-tipped	W-shaped	No	

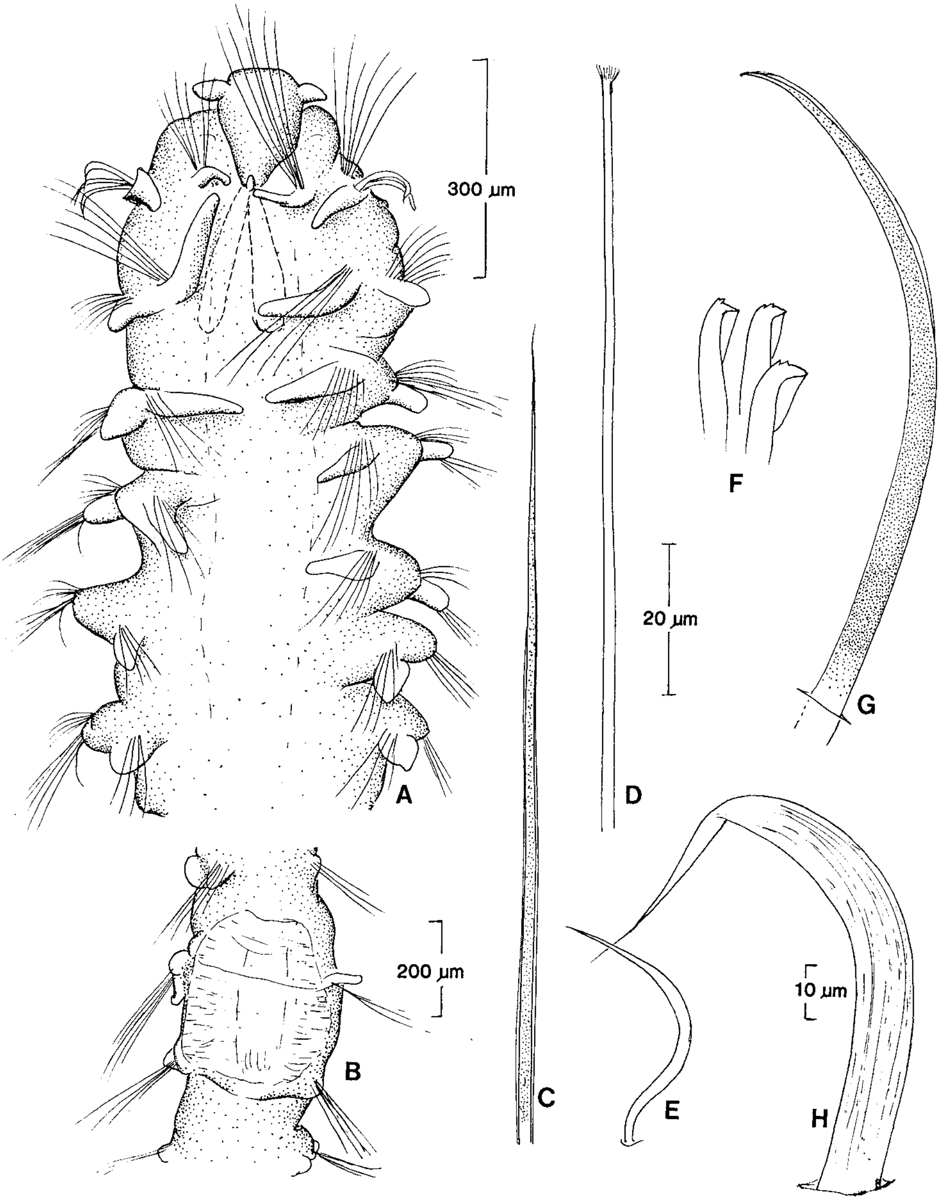

Figure 4. *Spiophanes abyssalis*, new species (holotype, USNM 80498). A. Anterior end in dorsal view, palps removed. B. Setigers 14-17 in dorsal view, showing internal gizzard. C. Capillary seta from neuropodium of setiger 1. D. Bacillary seta. E. Short curved seta from neuropodium of setiger 1. F. Neuropodial hooded hooks. G. Ventral sabre seta. H. Crook seta from neuropodium of setiger 1.

Description.—Holotype incomplete, 2.5 mm long, 0.4 mm wide, for 19 setigers. Color in alcohol yellowish white. Prostomium anteriorly rounded, with small, subdistal lateral horns; tapered posteriorly, ending on setiger 1; 2 faint eyes present on holotype; globular occipital tentacle present (Fig. 4A). Dorsal nuchal organ discernable on one specimen, as double loop extending to base of setiger 2 (Fig. 4A). Notopodial lamellae on setigers 1–4 shifted dorsally; lamellae tapered anteriorly, becoming lower, wider, rounded in middle setigers. Neuropodial lamellae slightly tapered on setiger 1, wider, triangular on setigers 2–4, thereafter lower, rounded, glandular. Interparapodial genital pouches lacking.

Notopodial setae long, narrow capillaries with thin sheath, setigers 1–7 with numerous setae arranged in irregular rows, posterior notosetae fewer, shorter. Neurosetae of setiger 1 include 1–3 stout, recurved, nongranulated crook setae (Fig. 4H), short, curved pointed setae (Fig. 4E), and few long limbate granulated capillaries (Fig. 4C). Capillary neurosetae of setigers 2–5 long, thin, becoming shorter, wider, granulated from setiger 6–15. Neuropodial hooded hooks tridentate, from setiger l5–16; reduced hood present (Fig. 4F). Ventral sabre setae from setiger 4–6, each seta curved, limbate, distally granulated (Fig. 4G). Bacillary setae from setiger 7, 4–6 per fascicle; each seta with smooth shaft, brushy tip (Fig. 4D).Gizzard present in setigers 14–17 (Fig. 4B). Pygidium unknown.

Remarks.—*Spiophanes abyssalis* is similar to *S. wigleyi* in the presence of a double-looped nuchal organ on the first few anterior setigers and tridentate hooks with a reduced hood, but differs in that the nuchal organ is very faint instead of obvious. Additionally, *S. abyssalis* has lateral prostomial horns, an occipital tentacle, and brush-tipped bacillary setae, rather than a rounded prostomium, no occipital tentacle, and bacillary setae that are bristled along their length as in *S. wigleyi*. *S. abyssalis* is similar to *S. bombyx* in having prostomial appendages, although these are of a different nature in the two species, being extensions of the prostomium (frontal horns) in *S. bombyx* and demarcated appendages (lateral horns) in *S. abyssalis*. *S. abyssalis* also differs from *S. bombyx* in having rather than lacking an occipital tentacle.

Etymology.—*abyssalis*, from abyss, from great depths.

Records.—Canary Islands, Bay of Biscay, North Atlantic; 1922–2356 m.

Spiophanes soederstroemi Hartman, 1953

Spiophanes kroyeri: Söderström, 1920: 240 (in part). Not *S. kroyeri* Grube, 1860.
Spiophanes söderströmi Hartman, 1953: 41 (in part).
Spiophanes chilensis Hartmann-Schröder, 1965: 215–218. fide Blake, 1983.
Spiophanes soederstroemi: Orensanz and Gianuca, 1974: 17–18.—Blake, 1983: 230–232, fig. 13.

Material Examined.—Chile: Puerto Tortuga bei Coquimbo, coll. G. Hartmann-Schröder 29°57.4′N, 71°22.9′W, 21 Feb. 1960, holotype of *Spiophanes chilensis*, ZMH P-14946. —Florida: off Ft. Pierce Inlet, coll. R. W. Virnstein, 27°33.2′N, 80°02.8′W, 26 Apr. 1977, 33 m, 5 spec. (IRCZM).—North Carolina: coll. D. Weston, Jun. 1977, sta. 236-1, 35°33.5′N, 75°13.0′W, 35 m, 1 spec. (NJM), sta. 237-1, 35°31.5′N, 75°13.0′W, 38 m, 8 spec. (NJM), sta. 497, coll. J. F. Grassle, 2 spec.; sta. 738, 1 spec.

Description.—Moderate-sized species, up to 14 mm long, 0.7 mm wide for 5 setigers. Color in alcohol opaque white to brown. Prostomium triangular to bell-shaped, broadly rounded on anterior margin, sometimes with short, laterally directed processes; posterior caruncle ending on setiger 1; eyes 0–4; occipital tentacle absent; nuchal organs present or absent. Notopodial lamellae long, cirriform in setigers 1–4, becoming shorter, stubby in appearance, reduced to small lobes by setiger 9. Neuropodial lamellae digitiform on setigers 1–2, becoming smaller, rounded on subsequent setigers, setigers 9–14 glandular. Ciliated middorsal ridges from setiger 19–20, continuing to posterior end. Interparapodial genital pouches absent.

Anterior capillary notosetae long, clear, with narrow sheaths; posterior notopodia include 1–2 very long, flat, distally curved capillaries in addition to normal setae; each long capillary thickened, pointed, with narrow sheath, clear. Anterior neuropodial capillaries short, broad, bilimbate, with finely granulated shafts; setiger 1 with 1–2 large, curved spines in addition to capillaries; quadridentate hooks without hood present from setiger 15; hooks with main fang surmounted by single unpaired tooth and pair of smaller teeth. Bacillary setae not apparent. Ventral sabre setae present, numbering 1–2 per fascicle. Pygidium with 2 anal cirri.

Remarks.—*Spiophanes soederstroemi* was considered indeterminable by Pettibone (1962) and Foster (1971). Blake (1983) reexamined the type specimens, comparing them with new material from South America, and also reexamined the type of *S. chilensis* Hartmann-Schröder. Blake's study resulted in the confirmation of *S. soederstroemi* as a valid species, and its synonymy with *S. chilensis*.

S. soederstroemi is most closely related to *S. duplex* Chamberlin (= *S. missionensis* Hartman, fide Blake, 1996) from California. The two species differ in that *S. soederstroemi* has rather than lacks enlarged notopodial setae and the notopodial lamellae of setigers 1–4 are positioned more laterally than in *S. duplex.* Also, *S. duplex* has a ventromedial papilla on the pygidium, whereas *S. soederstroemi* lacks this papilla.

The new records constitute a major range extension for this species, from the southern to the northern hemisphere.

Records.—Argentina, Uruguay, Chile; intertidal to 250 m; Florida, North Carolina, 33 m.

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